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"Congress makes a man a general,
communications makes him a commander "
Omar Bradley

THESIS: The combination of information technology and the resulting information volume will, in the military context, require us to maintain the current primary vertical hierarchical orientation, rather than flattening out.

INTRODUCTION

This paper, for purpose of stimulating thought, presents a largely contrary view from those that expect the information revolution to decentralize military command and control by largely flattening the traditional vertical military organization. This contrary position will be based on three primary assumptions. First, the future considered here will include information and intelligence technologies that are more revolutionary than evolutionary. Second, military organizations and military functions are sufficiently different from commercial ones that applying successful concepts from the latter to the former must be approached with great caution. Third, while it is healthy to examine assumptions, we probably need only modify the traditional vertical organization to accommodate increasing communications and information handling capabilities. Considering these issues is important because the United States military is seriously examining the reality and relevance of an emerging "INFOSPHERE".[1]

We should also be aware that not everything postulated about the concept of war in the information age (commonly referred to as "information warfare"), the "information revolution", or an ongoing "revolution in military affairs" is universally accepted. Opinion on all three, the possible relationships of the three, and even whether or not the first and third even currently exist, is diverse and often quite skeptical. Views

range from fervent believers in all three, to equally fervent denial of all three. This range in belief is the one thing that makes our current debate the same as all previous revolution yes/no debates.

There is one final point worth noting when considering the positions presented below. The official references used for support represent current orthodoxy and were selected by the author. Both the current orthodoxy and anyone's reference selection should always be viewed skeptically This is particularly important as one never wants doctrine to become dogma as a result of a lengthy time period passing without such a critical examination. The list of disasters resulting from such a degeneration is lengthy.

DISCUSSION

I. The future considered here will include information and intelligence technologies that are more revolutionary than evolutionary.[2] For our purposes here, we will assume that fully all the improvements in information handling technology and intelligence collection, analysis and dissemination postulated in the current Service and CJCS glossy pamphlets, and as presented by Lieutenant General Rokke on 8 March, 1995, and Mr. Carl Builder on 29 March, 1995, are accomplished. That is, virtually everyone in a theater can know virtually everything and talk to virtually every one else virtually at will. For these new capabilities to result in a true revolution some or all of at least three things must result: elements in a society or a military that did not fight before must now do so; new dominant military organizations must develop; and, the very form of war must change in important and discernible ways.[3]

Some assume, given this situation, that traditional vertical military hierarchies will be required to go very flat in order to survive and operate in a militarily effective manner.

Those that subscribe to this view argue that the primary reason that vertical hierarchies, including military ones, developed was to control and manage information. To accept this important function as the primary function is to ignore or obscure the fact that hierarchies also exist to set objectives, allocate resources, determine priorities and direct activities. Information and intelligence are only, albeit critical, decisionmaking components. Both, like other resources, are only potentials, and must be used in some fashion to realize any actual value. Their proper use to support the four command functions above is critical for military success. Information and intelligence are necessary but insufficient causes for modifying or creating new primary organizations.

Organizations, and especially their control hierarchies, develop because there are only two states within which human activities, particularly coercive ones like war, can take place. One state is anarchic, the other is authoritarian. The first means no structured forms of authority and the second means formal structured forms of authority. In neither state is it assumed that chaos will naturally be enhanced or reduced. Chaos exists in both states. What is postulated here is that formal military activities require authority and authority requires vertical hierarchy. The degree to which any "flattening" of a military organization can occur depends as much on human nature, social and other variables as it does on information technologies. At this time such variables do not appear to be supporting a radical flattening of the vertical. Perhaps they will appear in even the near future, but not yet.

We should remain open minded but cautious in deciding that a revolution is underway. Two examples will illustrate the problem One example is the idea that placing Global Positioning Satellite (GPS) receivers on individuals and select vehicles, and then integrating them into the Army's overall digital battlefield concept constitutes a revolution. By

themselves they are natural evolutionary improvements that take advantage of existing systems. While there is no denying both will improve some things, it is not yet clear they constitute a revolution along the lines of using the "civilian" telegraph and railroad in the American Civil War.[4] A second example is the belief of some that we are in the midst of revolution because we now broadly accept that intelligence dominance of the battlespace and the ability to create and exploit the "information differential" between ourselves and all others is critical to contemporary and future warfare.[5] Both of these examples will constitute a revolution when two or three of the required criteria discussed above are met. For instance, new information warfare formations appear that assume many combat functions from traditional maneuver and fire formations. One would also need to see a doctrine change that incorporated these new formations. In the meantime we need to remember intelligence dominance, in effect an "information differential", is as old as war itself. One has only to consider that both the oldest battles in recorded history involved surprise [6]

II. Military organizations and military functions are sufficiently different from commercial ones that applying successful concepts from the latter to the former must be approached with great caution. There are three fundamental differences pertinent here.

While the business world is certainly dynamic, it never has the volatility and uncertainties of war and never requires the same degree of personal and corporate risk as the military; death and physical destruction Repetitively executing largely unchanging process in no meaningful way reflects the dynamism and uncertainty of military operations However, it must be acknowledged that a paradox does exist relative to military decision making. That is, the very uncertainty of war requires that at some point the control represented by the vertical hierarchy must allow for significant initiative. At each echelon some level of personal initiative,

acted upon in accordance with the commander's intent, will be the, "best [way to] cope with the uncertainty, disorder, and fluidity of combat."[7]

A second fundamental difference is that military operations require a degree of control to both ensure expected behavior and protect intent that places them in a completely different category from all other human activities. This is particularly obvious in relation to security and deception. The requirement to apply "need to know" to both intelligence and operations requires a decision hierarchy. Maintaining security and deception in a largely flat organization that depends on widespread information sharing would be extremely difficult, if not impossible. Deception requires very central control both for security and execution. Deception requires one to not only act as incorrectly anticipated, but to also sometimes act in a manner not expected. This requires strict vertical control to ensure that a unit that is acting in a key deception role not leave that role based on a flattened organization's distributed decisionmaking.

Another major difference is the professional training, experience and maturity levels needed to command. Basic business concepts and skills can be learned from a book and then practiced in a physically benign office environment. Military concepts and some skills can also be learned from books, but must be practiced in a far less benign environment, with significantly greater penalties for failure. The art of war requires that higher echelons not be considered simply larger aggregates of tactical units. The relationship of violent actions taking place over time and over large and diverse topographies, requires that we not consider every company grade commander equal to the every corps, or numbered air force, or fleet commander. The differences in objective, time line, and span of interest are simply too great to be accommodated without training and experience at increasingly complex echelons. The business world is just not the same.

Finally, we should remember that transitions from information to directives and from directives to action require three types of decisions: information decisions, organizational decisions, and operational decisions. These decisions, because they are not all the same thing require a hierarchy As just one example, the need to task organize requires a senior to subordinate organization. There is nothing in history or current affairs to indicate that military units are self-organizing or self-tasking. Additionally, self-organizing and self-tasking would result in logistical and operations impossibilities, because all units cannot draw as they desire on limited resources.

III. To examine fundamental assumptions is healthy in all areas of human endeavor. It is particularly important in the military realm as the price of being wrong can be extremely high. It is also going to be entirely possible that at some point we will need to modify the traditional vertical organization. The current organizational concept of divisions, corps, armies, fleets, squadrons, etc. developed quite logically from changed circumstance. Additionally, James Schneider and Martin Van Creveld both present convincing cases for how these logical, and often resisted, organization changes have come about. Perhaps the real question now is just how much change is needed. Some argue a radical change, along the lines of changing armies from single masses to today's structures, is necessary. This analyst believes it far more likely that only some change is necessary, and, that, principally at the lower echelons. The radical elimination of the traditional vertical orientation to an essentially flat orientation will not work. It will not work especially given the assumed changes stated earlier, because the very capabilities to provide overwhelming amounts of information and intelligence throughout either a vertical or a horizontal military organization will, in themselves, preclude a

largely flat organization from being sufficiently more effective to warrant it's adoption.

First, the very capability to provide overwhelming amounts of information and intelligence throughout any organization will generate the need to impose filters to reduce the flow to appropriate content and rate **over time**. To do otherwise requires significant time be spent by all "equal" echelon elements delimiting, screening and absorbing information. Second, there is neither sufficient time nor sufficient need for all elements in a military organization to have the same level of knowledge and situational awareness. To argue otherwise raises the following fundamental question. Given the considerations of areas of interest and influence, and above all, seemingly natural span of control limitations, do we accept that corps and battalion commanders have the need or the where withal to know all the same things? Hierarchy is required if for no other reason then there are naturally varying temporal and spatial horizons, and all echelons have different ones. The limits of human capabilities to receive, process and use information also contributes to hierarchical development. There must also be control for the reasons of security and deception discussed above. All these points reinforce the need for both vertical control and a vertical labor distribution.

Finally, until a case can be made that we either have moved, or must move, from the contemporary distributed battlefield to something radically different, sequence and synchronization remain necessary because of war's size, scope and complexity [8] All three of which again contribute to the need for and utility of a vertical hierarchy.

CONCLUSIONS

Future war concepts indicate a trend toward increasing lethality, increased dispersion, smaller and more expensive forces, and engagement

in many more operations other than conventional war.[9] When combined with anticipated information technologies we will be in a situation requiring a capability to absorb and analyze increasing data volumes and flow rates. This will then require a capability to direct sensors, absorb and analyze very large data volumes, decide within shortening timelines, and then communicate in such a way that only a few centers can have the where withal to maintain a broad enough context to generate militarily useful decisions and commands. Every echelon simply cannot have the same information processing and display capabilities. Display screen size alone will be a primary limiting factor.

It may well be that what is truly revolutionary about the current debate is that it is occurring without the normal historical impetus for revolutionary change, catastrophic defeat. In any event, it still remains to be seen whether it will turn out to be fortunate that we became joint in time to take maximum advantage of a new information and intelligence dominant era, or ironic that we became joint in time to foster a common acceptance of what was misperceived as a new era

BIBLIOGRAPHY

Dept. of Defense. Office of Chairman, Joint Chiefs of Staff. C4I For the Warrior, Global Command & Control System (GCCS). Washington: GPO, 1994

Dept. of Defense. Office of Chairman, Joint Chiefs of Staff. Joint Warfare of the US Armed Forces, Joint Pub 1. Washington: GPO, 1991

Dept. of Air Force. Office Air Force Deputy Chief of Staff, Command, Control, Communications and Computers Plans and Policy Division. HORIZON, Air Force C4I Strategy for the 21st Century. Washington: GPO, Undated

Dept. of Army. Office of the Chief of Staff. Army Focus 1994, Force XXI. Washington: GPO, 1994

Dept. of Navy. Office of the Chief of Naval Operations. Naval Doctrine Publication 1, Naval Warfare. Washington. GPO, 1994

Dept. of Air Force. Headquarters US Air Force. Air Force Manual 1-1, Vol II. Washington: GPO, 1992

Dept. of Navy. Headquarters United States Marine Corps. Fleet Marine Force Manual 1. Washington: GPO, 1991.

Cameron, James, dir. Aliens. 20th Century Fox, 1986.

Czerwinski, Thomas J. "Information-Based Warfare: The Command Component at the Crossroads", Unpublished essay, 1994.

Dupuy, R. Ernest and Dupuy, Trevor N. The Encyclopedia of Military History. New York: Harper & Row, 1970.

Kubrick, Stanley, dir 2001: A Space Oddessy. MGM, 1968.

Price, William H. Civil War Handbook. Fairfax: Prince, 1961

Schneider, James J. "The Loose Marble--and the Origins of the Operational Art", Parameters (March 1989): 85-99.

Van Creveld, Martin. Command In War. Cambridge: Harvard UP, 1985.

Van Creveld, Martin. Supplying War: Logistics from Wallenstein to Patton Cambridge: Cambridge UP, 1977

ENDNOTES

[1] All three Services either discuss the "INFOSPHERE" directly, or explicitly refer to information, and by inference intelligence, as a now critical element for military success. See particularly: the double page schematic illustrating the relationship between the INFOSPHERE, the BATTLE SPACE, and the GCCS in the Joint Staff's C4I For the Warrior, Global Command & Control System; Naval Doctrine Publication 1, Naval Warfare, page 63; Air Force Manual 1-1, Vol. II, page 25.

[2] Hollywood may be showing the way with the movies Aliens and Patriot Games. In Aliens, a movie now **nine** years old, a combat landing team is put aboard a very large space freighter with a sergeant in charge. Everyone has a helmet mounted video camera and microphone. The lieutenant in command, however, stays aboard the adjacent military ship The reason for this split is not just a long standing one of the senior not always going with the combat unit. The primary reason is that only by staying aboard the military ship can the lieutenant view the large screen that displays the entire freighter schematically, and at the same time control the sensors that view the entire boarded ship. In this way an overall combat situation context is maintained by directing intelligence collection, analysis and dissemination, and by receiving information from the deployed unit. The making and communicating of command decisions then closes the C3I loop. All the classic elements of C3I are present and operating, but applied technology puts the commander on an electronic high ground. This requires physical separation if only because the deployed team cannot take a video screen large enough to view the entire freighter. Very interesting to note, especially for those enamored with instant communication across nets, is that one of the lieutenant's primary problems was maintaining communications discipline among even a small team of highly trained and experienced soldiers. Under combat stress nearly everyone had either a report, or a comment. The tens of thousands of E-mail exchanges reported to have occurred within US Central Command during the first hours of the Gulf War air campaign is also very instructive In Patriot Games the Director of Central Intelligence and an assistant at Langley, Virginia, watch actions taking place in the Middle East on very high resolution infra-red real-time satellite imagery. This imagery is of sufficient quality to locate and count one individual from another, and with subsequent analysis even determine gender.

One needs only review CNN coverage of the recent Haiti operation where the Secretary of Defense and the Chairman, Joint Chiefs of Staff,

watched real-time street action provided by helmet mounted video cameras on patrolling soldiers to appreciate Hollywood's marine boarding team and their lieutenant. One need only visit the National Information Display Laboratory to appreciate the potentials and problems of large screen display.

The double page schematic referred to in Endnote One illustrates the second example. All Services now consider space-based reconnaissance and surveillance essential to modern warfare, and imagery quality is merely a matter of budget and time. To those skeptical of both popular literature and movies as predictors, Jules Verne, H.G. Wells, Isaac Asimov, Voyage to the Moon, 20,000 Leagues Under The Sea, and 2001, A Space Oddessy are commended to name just a few. We should remember that over the last 100 years fiction has often lead fact.

[3] Two superb sources for gaining a fuller understanding of this point are Martin Van Creveld's books, Command In War and Supplying War. In any case, the debate over the relative roles of society, economics, and technology in creating military revolutions will, like most theological debates, never be settled in any universally objective fashion. For our purposes here it is assumed that a radical improvement in information handling technology will result in new and important military forms and conduct See also, Thomas J. Czerwinski's article, "Information-Based Warfare· The Command Component at the Crossroads", to be published. Mr. Czerwinski is on the Information Resources Management College faculty.

[4] For an excellent and succinct statement on the impact of the telegraph and the railroad see James J. Schneider, "The Loose Marble--and the Origins of the Operational Art," Parameters (March 1989): 85-99. One illustration of their impact is that in one year, 1864-1865, the Federal Military Railroad delivered over five million tons of supplies to the field armies.

[5] Joint Warfare of the US Armed Forces, Joint Pub 1, page 57, discusses the value of this exploitation at all three echelons, strategic, operational, and tactical. Naval Doctrine Publication 1, Naval Warfare, page 63, goes even further and states, "Control of information exploitation is so important that it has become a warfare objective in its own right."

[6] Both Meggido, 1493 BC, and Kadesh, 1294 BC, involved surprise. Surprise in the first instance by an Egyptian army stealing a march on Palestinian rebels, and by a Hittite ambush of an Egyptian army in the second.

[7] Fleet Marine Force Manual 1, for instance, goes on to acknowledge that we must "thrive" in chaos, uncertainty, constant change, and friction of war See particularly pages 61-62 and 64-65.

[8] See again James J. Schneider's article, particularly pages 89-90.

[9] We must keep in mind that one of the few things most analysts do agree upon about the future is that it will provide ever increasing opportunities for operations other than war However, just how great an effect these opportunities will be remains to be seen. The various costs of such operations may reduce them to a level far below that expected by most, and below that desired by some. The current burden on readiness, O&M, and simple wear and tear on personnel and equipment is already raising serious questions both in and out of the military about just how many such operations can be undertaken The severe budget pressures already evident, talk of a 150 billion dollar defense budget for instance, may well mean that we are forced to do almost no "little ones" in order to be able to do one "big one".